



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, ILLINOIS 60604**

SUBJECT: CLEAN AIR ACT INSPECTION REPORT
Evonik, Mapleton, Illinois

FROM: Veronica Fischer, Environmental Engineer
AECAB (MI/WI)

THRU: Sarah Marshall, Section Supervisor
AECAB (MI/WI)

TO: File

BASIC INFORMATION

Facility Name: Evonik Industries

Facility Location: 8300 West Route 24, Mapleton, IL 61547

Date of Inspection: May 4, 2022 – May 6, 2022

EPA Inspector(s):

1. Veronica Fischer, Environmental Engineer
2. Constantinos Loukeris, Environmental Engineer

Other Attendees:

1. Matt Simon, Environmental Health and Safety (EHS) Manager
2. Scott Sedlacek, Site Head
3. Ryan Lowry, Derivatives Plant Manager
4. Kyle Burke, Fatty Acids Plant Manager
5. James Tyler, Environmental Engineer

Contact Email Address: matt.simon@evonik.com

Purpose of Inspection: To evaluate compliance with the Chemical Accident Prevent Provisions (40 C.F.R. Part 68), also known as Risk Management Program (RMP)

Facility Type: Specialty chemicals manufacturing

Regulations Central to Inspection: 40 C.F.R. Part 68 – Chemical Accident Prevention Provisions

Arrival Time: 1:00 PM CST, 5/4/2022

Departure Time: 10:00 AM CST, 5/6/2022

Inspection Type:

- Unannounced Inspection
- Announced Inspection

OPENING CONFERENCE

- Presented Credentials
- Stated authority and purpose of inspection
- Small Business Resource Information Sheet not provided. Reason: not a small business.
- Provided CBI warning to facility

The following information was obtained verbally from plant personnel unless otherwise noted.

Process Description:

Evonik Industries is a specialty chemical manufacturer. The Mapleton, IL plant produces various surfactants and derivatives of fatty acids. The facility has two plants: the derivatives plant and the fatty acids plant. The derivatives plant has processes that are subject to the provisions at 40 C.F.R. Part 68. The RMP subject chemicals onsite include anhydrous ammonia, aqueous ammonia, formaldehyde, and methyl chloride. The facility also has a hydrogen plant; however the quantity of hydrogen onsite is below the RMP applicability threshold. The facility uses fatty acids to make nitriles which are then used to make primary, secondary, and tertiary amine products. Secondary and tertiary amines are also used in a quaternization reaction to make a quaternary ammonium salt.

The facility has three distillation processes to refine nitriles and amines, and to recover methyl chloride. The facility also has three nitrile reactors, four hydrogenation reactors, and four quaternization reactors. All of the reactors are operated as batch processes. Anhydrous ammonia is used as a reagent in nitrile production. The crude nitrile is then distilled to be used as a reagent in the production of primary, secondary, and tertiary amines. Ammonia and formaldehyde are used in the hydrogenation reactors. Following the hydrogenators are the quaternization reactors which uses methyl chloride as a reagent. Both ammonia and formaldehyde are consumed in the hydrogenators, therefore methyl chloride is the only RMP subject chemical present in the quaternization reactors. Each of the quaternization reactors has a methyl chloride recovery system associated with it.

Staff Interview:

EPA inspectors interviewed operators for each of the operating stations in the control room. Nitrile operators rotate between inside operator positions and outside operator positions. Inside operators operate the process from the control room, while outside operators handle upsets in the field, take samples, and charge catalyst to the reactors. Operators stated that all safety related instrumentation is equipped with interlocks. Alarms appear as visual indicators in the control room, including alarms associated with the hydrogen and lower explosive limit (LEL) monitors. The facility stated that there are no audible alarms in the control room. When EPA inspectors asked if there was a specific reason that all the alarms were only visual, facility personnel stated that there used to be audible alarms, however the new control system does not support the use of audible alarms. All alarms that are part of a safety instrumented system (SIS) must be cleared manually by the operators by meeting pre-specified conditions. The operators for the hydrogenation and quaternization reactors perform duties both inside the control room and outside in the field. Facility personnel stated that the time away from the control room to perform outside tasks is typically 20 – 30 minutes at a time. Facility personnel stated that while the operators are in the field, their work station in the control room is left unattended and other control room operators typically do not watch over the unattended board. EPA inspectors asked if work stations in the control room get alarms from other work stations and facility personnel stated that there is currently an open project to reconfigure alarms so that operators only receive alarms associated with their own work station. Facility personnel stated that receiving alarms associated with work stations that they were not assigned to resulted in too many nuisance alarms. EPA inspectors requested a copy of the alarm management system and facility personnel stated that there is no document for the facility that describes overall alarm philosophy. EPA inspectors also asked for a copy of any management of change (MOC) that was performed for the alarm reconfiguration project, and facility personnel stated that they would look for an MOC but it is possible that an MOC was not performed for that project.

EPA inspectors requested a copy of the last compliance audit performed for the site. Facility personnel stated that the last compliance audit was completed in September 2021, however the final report and recommendations had not been completed as of the date of the inspection.

EPA inspectors requested inspection history and a description of damage mechanisms for select pieces of equipment. For compressors 262C2 and C3, EPA requested vibration analyses. Facility personnel stated that the facility has had trouble obtaining records from the vendor. For Quaternization Reactor 1, facility personnel were able to confirm completion of the inspection, however the inspection report was missing confirmation notes. For Tank 3379, the latest inspection report was from 2013, and facility personnel confirmed that a 2018 external inspection was missed. The tank was incorrectly set to a 10-year inspection schedule, instead of a 5-year schedule.

EPA inspectors reviewed process hazard analysis (PHA) recommendations and noted that it takes several months for recommendations to be assigned to the appropriate personnel.

TOUR INFORMATION

EPA Tour of the Facility: Yes

Data Collected and Observations:

EPA inspectors performed field walkdowns of select piping and instrumentation diagrams (P&IDs). The selected P&IDs were of the Hydrogenator 7 Reactor, Hydrogenator 7 Condenser and Water Receiver, Nitrile Condensation Reactor (NCR) 4, NCR 4 Ammonia-Water Receiver, Quaternization 2 Reactor, and Quaternization 2 Alcohol Recovery Separator. EPA inspectors identified two discrepancies between valves labeled on the P&ID and valves labeled in the field. Valve 164CSO009 in the field was labeled on the P&ID as 164CSO220. Valve 164CSO030 in the field was labeled on the P&ID as 164CSO020. Facility personnel confirmed that the field labeling was correct, and the labels on the P&IDs were incorrect.

During the facility walkthrough, EPA inspectors noted a strong ammonia odor around the ammonia stripper near the NCR 4 reactor. Facility personnel ventilated the area during the inspection by opening a door. EPA inspectors asked if the enclosed areas of the plant where ammonia is present are equipped with ammonia detectors. Facility personnel stated that the only gas detection systems currently at the facility are for hydrogen and LEL, not ammonia or methyl chloride, however there is an open project to install a gas detection system for hydrogen, LEL, ammonia and methyl chloride in the process areas.

During the facility walkthrough, EPA inspectors noted several drums at various sample points that were open to atmosphere. EPA inspectors requested a waste profile on the contents of each of the drums to determine if the contents are hazardous waste. EPA inspectors also toured the control room and noted that the hard copies of the emergency procedures for Quaternization Reactors 2 and 3 stated that they were valid until June 6, 2020. Hard copies of the emergency procedures for Quaternization Reactors 1 and 4 could not be located.

Photos and/or Videos: were taken during the inspection.

Field Measurements: were not taken during this inspection.

RECORDS REVIEW

The following records were reviewed onsite and copies were taken for further offsite review:

1. Inspection history for reactor 1
2. Degradation mechanism for reactor 1
3. Inspection history for exchangers 6/8
4. Degradation mechanism for exchangers 6/8
5. Vibration analysis for compressors 2/3
6. Inspection history for exchanger 505
7. Degradation mechanism for exchanger 505
8. Inspection history for NCR 5
9. Degradation mechanism for NCR 5
10. Inspection history for R1A
11. Degradation mechanism for R1A
12. MOC 12978, 8307, 8086, 7404, 10395, 8452, 7675

13. Incident report 77470, 69238, 51498, 12472, 6879
14. List of operators
15. List of MOCs for the last 2 years
16. Current list of operating procedures
17. PHA schedule
18. Open PHA recommendations
19. Opening presentation
20. Process flow diagrams for Derivatives Plant

CLOSING CONFERENCE

- Provided U.S. EPA point of contact to the facility

Requested documents:

- Hydrogen Plant mass balance and quantity
- Copies of latest PHAs for each PHA unit
- 10 years of operator training records
- Training policy on operations
- Training policy on EHS
- Mechanical integrity policy
- RMP/Process Safety Management (PSM) procedure
- PHA procedure
- 5-year accident history
- Worst-case release scenario
- List of incident investigations for the last 1.5 years
- Last 2 compliance audits
- P&IDs for all of the covered processes
- List of equipment subject to RMP/PSM
- PHA for new tanks
- MOC for new tanks
- Date installed for new tanks
- Annual certification documentation for operating procedures
- List of product procedures
- NCR 4 emergency procedure
- List of car sealed valves
- PSV design information
- Hazardous waste profile
- Hydrogenator 9 PHA
- List of RMP/PSM near misses
- MOC screening questions
- Scope documents for gas detection system
- MOC policy

Concerns:

EPA inspectors communicated the following concerns with facility personnel:

- There are no audible alarms for any of the processes, including the gas detection system which is used to detect a release of highly flammable material, and there are regular periods of time where the operating boards are left unattended.
- There is no alarm management system implemented at the facility.
- PHA recommendations are not assigned until several months following completion of the PHA.
- Recommendations and the final report from the September 2021 compliance audit had not been completed at the time of the inspection.
- Documentation for training does not document training on specific product procedures.
- Annual certifications of operating procedures are not itemized.

DIGITAL SIGNATURES

Report Author: VERONICA FISCHER  Digitally signed by VERONICA FISCHER
Date: 2022.07.05 16:55:11 -05'00'

Section Supervisor: ALEXANDRA LETUCHY  Digitally signed by ALEXANDRA LETUCHY
Date: 2022.07.05 16:56:41 -05'00'

Facility Name: *Facility Name*

Facility Location: *Facility Address*

Date of Inspection: *Select date by clicking on the arrow*

APPENDIX A: DIGITAL IMAGE LOG

1. Inspector Name: Constantinos Loukeris	2. Archival Record Location: OneDrive
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Image Number	File Name	Date and Time (incl. Time zone and DST)	Description of Image
1	Hyd 7 2 nd floor #1	5/5/2022, 3:10 PM	Hydrogenator 7 sample drum
2	Hyd 7 2 nd floor #2	5/5/2022, 3:10 PM	Hydrogenator 7 sample drum
3	Hyd 9 2 nd floor #1	5/5/2022, 3:10 PM	Hydrogenator 9 sample drum
4	Hyd 9 2 nd floor #2	5/5/2022, 3:10 PM	Hydrogenator 9 sample drum
5	NCR 4 2 nd floor #1	5/5/2022, 3:10 PM	NCR 4 sample drum
6	NCR 4 2 nd floor #2	5/5/2022, 3:10 PM	NCR 4 sample drum
7	NCR 4 2 nd floor #3	5/5/2022, 3:10 PM	NCR 4 sample drum